Unconsolidated material is not necessarily soil. If such material is without biological input or modification, such as the presence of at least minimal horizons other than unweathered parent material, it has not traditionally been recognized as soil. Unconsolidated material can hold liquids, gases, etc. and yet is considered to be raw geologic material (not soil) until pedologic alteration becomes evident. Lack of biological material or evidence of biological alteration in some form (past or present) precludes “soil” on extraterrestrial bodies.

There has been a long-standing and ongoing struggle between geology and soil science communities regarding what is, and what is not, soil. The much debated distinction has hinged upon the presence and effects of soil-forming processes, specifically those involving biotic phenomena. Clearly, non-biotic chemical reactions, alterations, and processes occur in unconsolidated geologic material, but there is something unique about the consequences of biological processes that change chemo-dynamics and the resulting products and thus produce soil.

If a surface material does not meet all of the factors of soil formation, including the biological factor or component, we must agree that it cannot be considered a soil. Until it is proven that life forms exist in and have modified surface materials of extraterrestrial planets and moons, these should not be considered “soils” in context as Earth-borne and the fundamental concepts of soil formation. What is to become of Jenny’s (1941) soil-forming factors as the traditional basis for soils in the landscape in light of the influence of the O (organism) factor? Will works such as his be relegated to “soil science history”?

There is already a perfectly good, widely accepted term for fragmental and unconsolidated rock material on any celestial body:

regolith—A general term for the layer or mantel of fragmental and unconsolidated rock material, whether residual or transported and of highly varied character, that nearly everywhere forms the surface of the land and overlies or covers the bedrock. It includes rock debris of all kinds, volcanic ash, glacial drift, alluvium, loess, and eolian deposits, vegetal accumulations, and soil. The term was originated by Merril (1897, p. 299). … (Neuendorf et al., 2005)

This new soil definition (see article in the October 2017 CSA News magazine: http://bit.ly/2zaio18) does not sound like consensus and should be discussed and adjudicated, not by a few representatives, but by the entire soil science community. Following is a sampling of the many papers that describe early soil formation, including the biological input: Kato et al., 2005; Haugland, 2006; Phillips et al., 2008; Vilmundardóttir et al., 2015; Rossi and Rabenhorst, 2016.

References

S. Logsdon, P. Schoeneberger, and R. Kremer, members of the SSSA Soil Glossary working group.

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